

JAN MCLIN:CLAYBERG

PATENT AND TECHNICAL TRANSLATION

JAN MCLIN CLAYBERG •
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ACCREDITED BY AMERICAN TRANSLATORS ASSOCIATION
• GERMAN AND FRENCH TO ENGLISH
•• ENGLISH TO GERMAN

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DECLARATION

The undersigned, Olaf Bexhoeft, hereby states that he is well acquainted with both the English and German languages and that the attached is a true translation to the best of his knowledge and ability of the German text of PCT/DE2003/002598, filed on 08/01/2003, and published on 03/25/2004 under No. WO 2004/024448 A1, and of sixteen (16) amended claims.

The undersigned further declares that the above statement is true; and further, that this statement was made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or document or any patent resulting therefrom.



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Specification

Printing Machines Comprising Several Printing Groups

The invention relates to printing presses with several printing groups in accordance with the preambles of claims 1 or 2.

A web of material, for example a web of fabric to be imprinted, or a paper web, is imprinted in each printing group of such a press and, following their passage through the dryer, the webs are combined into a strand, which is divided into individual batches.

Customarily, the imprinted webs are conducted out of printing groups of such a press, which are placed aligned in a first direction, in a direction which extends in a plane defined by this first direction and a vertical line.

This way of guiding the web raises a lot of problems. If it is intended to assign its own dryer to each printing group for drying the web imprinted in it, the option basically exists to arrange the dryer vertically above the printing group in an extension of the latter, so that extremely high buildings are required for the placement of such a printing press. If, on the other hand, it is decided to conduct the webs horizontally through the drying devices, an arrangement results, wherein the dryers are placed between the printing groups and therefore the press has a very great length in the alignment direction. This leads to greatly different web lengths between the individual printing groups and the folder, so that the printing groups must be operated with a large phase offset in order to achieve the correct position in respect to each other of the webs at the folder.

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Although a more compact construction could possibly be achieved by providing a common dryer, through which the webs from all printing groups are conducted together, this solution has the disadvantage that, depending on the placement of the dryer in respect to the printing groups, webs must be conducted between the printing group and the dryer over long distances and must be supported, or must be rerouted several times. In the course of this, smearing of the not yet dry ink at the deflection or support rollers can occur, and therefore a loss of quality of the printed products.

DD 58 311 discloses a rotary printing press, wherein a dryer is placed downstream of each printing group, and wherein several folders are arranged.

DE 40 12 396 A1 and DE 44 08 027 A1 show web-fed printing presses with dryers and folders, wherein the axes of rotation of the folding cylinders of the folder extend parallel with the longitudinal direction of the dryer.

The object of the invention is based on creating printing presses with several printing groups.

This object is attained in accordance with the invention by means of the characteristics of claim 1 or 2.

It is a particular advantage of the press that it allows a compact construction with short paths of all webs to be imprinted between the printing group and the folder. Since the imprinted webs exit from the printing group transversely in respect to the alignment direction of the printing group, the dryers can be arranged transversely in respect to the alignment direction of the printing group, and therefore neither require a large structural height nor large

distances between the printing groups in the alignment direction.

The axes of the cylinders delimiting the printing gaps of the printing groups are oriented parallel to the alignment direction, so that the imprinted web can be conducted to the dryer from the outlet of the printing group without deflection or turning.

The path guidance of the webs to be imprinted from the bottom to the top of the printing groups makes possible the arrangement of the dryers approximately at the outlet level of the webs from the printing groups, so that a space at the bottom, which remains unoccupied underneath the dryers, can be used otherwise. For example, roll changers for the material supply of the printing groups, as well a possibly conveying devices for transporting fresh rolls of material to be imprinted to the roll changers and for carrying off used rolls can be usefully arranged in the space below the dryers.

The printing press in accordance with the invention is equipped with two folders. These are also usefully set up in the alignment direction.

The folders are usefully located in the space between two structural components, each being formed by a printing group, a dryer and a turning bar arrangement for feeding the web of material exiting from the dryer to the folder. In this way it is possible to feed a paper web imprinted in one of the printing groups selectively to one of the two folders. If the number of pages of a product to be printed does not fully occupy the capacity of the printing groups, the option is provided by means of this to employ a printing group not required for this print job, together with the second folder,

for producing a second printed product, which can be independent of the first one.

A further advantage resides in that the production does not come to a stop if one folder fails, and production can be continued via a second folder instead.

Preferably, the first of the two folders is arranged centered between the structural components in order to minimize the differences in the path lengths between the output of the individual printing groups.

It is also conceivable to arrange the first and second folders in spaces which do not adjoin.

An exemplary embodiment is represented in the drawings and will be described in greater detail in what follows.

Shown are in:

Fig. 1, a schematic view from above on a printing press in accordance with the invention, and

Fig. 2, a lateral view of the press.

A greatly schematized view from above on a printing press, in particular a heat-set printing press for printing telephone directories, is represented in Fig. 1. The press comprises four four-color printing groups 01, 02, 03, 04, which are laid out for a width of six pages of the web 07 to be imprinted. The axes of the printing cylinders lie parallel in respect to the alignment direction (vertical in Fig. 1) of the printing groups 01, 02, 03, 04. As represented in Fig. 2, each printing group 01, 02, 03, 04 is supplied with a paper web 07 by a roll changer 06, which web enters the printing groups 01, 02, 03, 04 at the bases of the latter and leaves them at the upper end.

Because of the arrangement of the printing groups 01 to 04 with cylinder axes extending parallel in the alignment direction, it is not possible, as with the conventional construction in series, in cases where four-color printing is not performed in every printing group and more webs than printing groups exist, to conduct a paper web successively through two printing groups for being able to imprint simultaneously. However, this is not disadvantageous in connection with the telephone directory printing press, since printing of telephone directories, in particular for the North American market, is essentially performed in four colors.

In the schematic representation of Fig. 2, the paper web 07 is represented as initially being conducted vertically out of the printing group 01, and is deflected into a horizontal path at a point 08, which can be provided by a deflection roller. It is of course also possible to construct the printing groups 01, 02, 03, 04 in such a way that the paper web 07 leaves the last printing gap directly in a horizontal orientation and is in this way conducted to a dryer 09 arranged downstream of the printing group 01 without being deflected at all.

A longitudinal direction of the dryer 09 is arranged transversely to the axes of rotation of at least one cylinder group delimiting the printing gap.

The horizontally oriented dryer 09 is arranged above the roll changer 06 and therefore does not occupy its own space for placement.

A cooling roller arrangement 11 is located at the outlet of the dryer 09. After passing through the cooling

roller arrangement 11, the paper web reaches turning bars 12, 13, 14 or 16, at which it is deflected into the alignment direction.

Thus, the printing press has four structural components, each being assembled from a printing group 01 to 04, the turning bars 12, 13, 14 or 16, and the components 09 and 11 respectively placed between them.

A first folder 17 is arranged in a space between the second and third structural components containing the printing groups 02 or 03, a structurally identical folder 18 is located between the first and second structural components. The turning bar 13 of the second structural component can be flipped over in order to feed the paper web 07 imprinted by the printing group 01 selectively to the first and the second folder 17 or 18.

Each folder 17, 18 has two blades (not represented) for the longitudinal cutting of the paper webs 07 fed to it into partial webs, each of a width of two pages, and three formers 19 for the longitudinal folding of the partial webs obtained in this way, A transverse cutting unit with a transverse cutting cylinder 23 for separating the partial webs into individual batches, a folding blade cylinder 21 which, together with a folding jaw cylinder 22, transversely folds the batches obtained, and a pile elevator, are arranged downstream of the formers 19. The design of such a folder is known and need not be explained in detail here.

The axes of rotation of the first transverse cutting cylinder 23 of the two folders 17, 18, and the axes of rotation of at least one cylinder group delimiting a printing gap are arranged to extend parallel.

An advantage of the presence of the two folders 17, 18 is that redundancy is created, so that with the failure of one of these devices it is possible to continue the operation of the printing press by using the other one.

However, the particular advantage of the two folders 17, 18 is the increased flexibility in production. A printing press with a single folder only runs at the best possible efficiency if all its printing groups print webs of maximum width. In case of the example considered here, having four printing groups 01 to 04 which imprint both sides, and webs 07 of a width of six pages, this means that 48 pages are being printed with each rotation of the printing cylinders by one plate width. If it is assumed that each of the printing cylinders supports four plates in the circumferential direction, which are different in pairs, twice 96 pages are being printed during each complete revolution of the printing cylinders. This therefore is an amount of batches at which the optimal use of the press results if only one folder is provided. However, such amounts of batches are not always obtained; in general, when printing a telephone directory there will be at least one batch which is smaller.

In connection with the press represented here, there is a multitude of possibilities for feeding the webs imprinted in the individual printing groups 01 to 04 to different ones of the folders 17, 18, and to process them in the latter independently of each other. This means that, when a batch to be produced does not reach the optimal amount of 96 pages and can be imprinted by using fewer than the four maximally possible webs, printing groups not needed for this, together

with one of the two folders 17, 18, can be employed for a different production. This results in a plurality of production options, which have been collected in the table below. In the table, for each one of the printing groups 01 to 04 the respective folder 17, 18 is shown on which the paper web imprinted by the respective printing group is imprinted, for each one of the folders 17, 18 the mode of operation "collection" or "no collection", as well as the number of batches obtained per revolution of the plate cylinders and the number of their pages.

Printing Group 01	Printing Group 02	Printing Group 03	Printing Group 04	Folder 17			Folder 18		
				Coll.	Batch	Pages	Coll.	Batch	Pages
17	17	17	17	n	2	96	-	-	-
17	17	17	18	n	2	72	n	2	24
17	17	17	18	n	2	72	y	1	48
17	17	18	18	n	2	48	n	2	48
17	17	18	18	n	2	48	y	1	96
17	17	18	18	y	1	96	y	1	96
17	18	18	18	n	2	24	n	2	72
17	18	18	18	y	1	48	n	2	72
18	18	18	18	-	-	-	n	1	96

The number of pages indicated in the table relates to the case wherein paper webs of a full width of six pages are imprinted. Webs of a width of four or two pages can of course also be used, in that case the indicated number of pages is correspondingly reduced.

List of Reference Symbols

01	Printing group, four-color printing group
02	Printing group, four-color printing group
03	Printing group, four-color printing group
04	Printing group, four-color printing group
05	-
06	Roll changer
07	Web, web of material, web of material to be imprinted, paper web
08	Point
09	Dryer
10	-
11	Cooling roller arrangement
12	Turning bar
13	Turning bar
14	Turning bar
15	-
16	Turning bar
17	Folder, first
18	Folder, second
19	Former
20	-
21	Folding blade cylinder
22	Folding jaw cylinder
23	Transverse cutting cylinder

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